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Research Paper

"Clinical simulation as a learning tool in undergraduate nursing: Validation of a questionnaire"☆,☆☆

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SUMMARY

Background: Clinical simulation allows both students and professionals to perform their clinical practice in a safe environment, facilitating the standardization of contents and promoting the integration of theoretical knowledge into the clinical practice.
Objectives: To design and validate in Spanish the Satisfaction Scale Questionnaire with High-Fidelity Clinical Simulation, instrument created to assess the nursing students' satisfaction with the use of clinical simulation in training.
Methods: The scale items were developed from a review of the literature. Content validity was established by an expert panel. This questionnaire was validated by 150 nursing students in the second year of the Bachelor Degree in Nursing at a Spanish university during the academic year 2013/2015. Lawshe formula was used to determine its validity, while for the construct validity a factor analysis was conducted using the principal component and Varimax rotation. Cronbach Alpha was used to determine internal consistency.
Results: The questionnaire developed presents satisfactory internal consistency (alpha 0.857). The factorial analysis indicated a structure of eight principal components that explain the 62.85% of the total variance explained, and in turn each subscale presented acceptable internal consistency. Frequency analysis results show a satisfaction degree higher than 80%, emphasizing "the realism of the cases" (98.7%), that "many benefits are obtained as clinical simulation relates theory to practice" (98.7%), "priorities are established "(97.4%)," errors are corrected after debriefing" (93.4%), and "communication and teamwork improved" (90%).
Conclusions: The scale designed and validated on high-fidelity clinical simulation in the Spanish population is satisfactory and adequate. Nursing students at the University of Cantabria (Spain) reported a high satisfaction degree with clinical simulation, confirming its usefulness in the teaching–learning process.

Introduction

The Spanish University System is, as other European Universities systems, in a process of innovation and reform of the higher education institutions trying to even the many educational procedures. The main objective of such process is to revitalize the recognition of the teachers' academic role and the organization of teaching based on student-centered learning, the introduction of competence-based education, new teaching methods and models to assess not only knowledge but also skills and abilities (National Agency for Quality Assessment and Accreditation, 2008; Declaration, 1999; Ministry of Education, Culture and Sports., 2003).

It is necessary to incorporate new teaching methods aimed at the integration of knowledge into the clinical setting, that is, aimed at assessing knowledge, skills and attitudes to be transmitted in the Bachelor degree in Nursing. These clinical competences could be defined as "the degree to which a person can use their knowledge, skills, attitudes and good associated judgment to his profession, to address adequately the situations of their exercise" (Kane, 1992; Pittman, 2012; Garrett et al., 2011).

Numerous schools of nursing and medicine are making changes in curricula and new approaches in designing and implementing programs of educational strategies (Garrett et al., 2011; Bagnasco et al., 2014.). However, few Spanish schools or faculties have incorporated Clinical Simulation (CS) as a learning method complementary to other teaching strategies. CS can be a good complement to the Practicum in a real clinical setting, not a substitute for this, as the experience of reality has

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overtones that are not reproducible in a simulated environment (Ricketts, 2011).

The use of CS as a training tool for health professionals has increased during the last ten years, being evident its effectiveness in decision-making and acquisition of technical skills and communication (Hsu et al., 2015; Gordon, 2012; Ricketts, 2011; McCaughey and Traynor, 2010; Franklin et al., 2014; Shin et al., 2015). CS allows clinics to implement actions in a realistic environment without risk for patients and professionals, facilitating the standardization of educational contents, helping to identify training deficiencies and promoting the integration of knowledge and complex clinical skills (Oh et al., 2015; Ricketts, 2011; Shin et al., 2015; Stayt et al., 2015).

A recent meta-analysis concluded that simulation programs at undergraduate level are more effective than traditional learning methods. Thus, training is required for teachers to impart them (Shin et al., 2015; Foronda et al., 2014). Student formation prior to their exit to employment is a major challenge, CS is helpful/beneficial to complete their training as it means putting theory into practice in real environments in a suitable learning environment, based on learning from experience and personal reflection giving address to many of the needs expressed (Oh et al., 2015; Norman, 2012).

Although there is no universally accepted classification, a review of the literature highlights a wide variety of methods in CS that can be performed with numerous systems, depending on the objectives pursued, containing simulators for learning in care and diagnostic and therapeutic techniques, some specialties mannequins or actors simulating patients as well as software (Shinnick and Woo, 2015;. Bland et al., 2011; McCaughey and Traynor, 2010). With respect to the types of procedures Lapkin subdivides these into low, medium and high fidelity according to their degree of realism (Lapkin et al., 2010), understanding the word fidelity as the way in which the simulation model resembles a human being.

CS is an active methodology that provides students with a real clinical and risk free experience, it promotes learning and teamwork, and it also helps to make clinical decisions and continually develop search for knowledge (McGaghie et al., 2010). An essential aspect during the procedure is the *debriefing*, defined as the discussion between several people to check a real or simulated case, where participants analyze their actions and reflect on the thinking processes. Various publications (Levett-Jones and Lapkin, 2014; Dufrene and Young, 2014; Maestre et al., 2014) confirm that the debriefing after the completion of a case becomes effective learning, thus it should be included as a basic component of all simulation experiences.

Various instruments have been developed to measure students' satisfaction in the field of clinical simulation, teamwork, and decision-making, among others (Levett-Jones et al., 2011; Oh et al., 2015; Sigalet et al., 2012;. Franklin et al., 2014). However, currently there is no scale validated in Spanish to assess the satisfaction of nursing students with the use of high-fidelity simulators in CS within their education.

Therefore, the main objective of this study is to design and validate the questionnaire in Spanish which has been called Satisfaction Scale with High-Fidelity Clinical Simulation in Students, (SSHF). This is an instrument created to assess the nursing students' satisfaction with their formation. A secondary objective is to describe the nursing students' satisfaction degree with the use of the CS in managing priorities and making decisions in simulated critical situations in real practice.

Materials and Methods

This is a joint study with quantitative and qualitative methodology. With regard to the quantitative design it was transversal descriptive. An exploratory approach and information on the needs and perceptions of students about the use of the CS in their formation was used in the qualitative design, as this will complement the design of the quantitative study in an enriching way.

The creation of the questionnaire followed two phases: the first one was an extensive literature review to select the items, and the second was the submission of the questionnaire to the judgment of a panel of experts to be finalized. The final questionnaire consisted of 38 questions with Likert five degrees (strongly disagree, disagree, indifferent, agree, strongly agree) and three open questions.

Then, the development of the CS activities with high-fidelity simulators, from which satisfaction degree was assessed by using a questionnaire. After that, the process for developing the questionnaire was described. Finally, the psychometric analysis of questionnaire and statistical analysis of the results were also explained.

Activity Design

Clinical simulation was performed in Valdecilla Virtual Hospital (HVV) (Santander, Spain), that is a specialized training and clinical simulation center, which work together with the Center of Medical Simulation in Cambridge, MA (USA) as result of a collaboration agreement. Currently the School of Nursing at the University of Cantabria (Spain) has an agreement with the HVV for the CS practice.

Eight scenarios recreated patients with diagnoses of acute coronary syndrome (ACS), arrhythmias, and procedures such as cardioversion and cardiac catheterization. These were performed either at a hospital ward or at an emergency room. They occurred in two stages and corresponded with two cardiac diagnostic procedures, but each one was designing in different scenarios and with different patients. For example, a scenario recreated a man with ACS, and the other, a woman with the same diagnosis.

The general requirements for the proper conduct of the simulation (e.g., confidentiality on the participants performance and on the simulated cases characteristics) were previously explained to students, and they were also informed that the objective of this activity was not to assess student's performance, but to favor their learning.

When designing the scenarios all the following elements were defined: the necessary staff (a nurse performing on stage, a technical management model (software), and an instructor who led the development on stage and the subsequent reflection), the script of the history, the starting exploration variables (e.g., taking vital signs, neurological assessment, cardiac/respiratory auscultation, monitoring, control of peripheral catheters, etc.), additional tests available and changes likely to be made according to expectations (e.g., increasing hemoglobin saturation if oxygen is administered).

Scenario Development

The activity took place during the 2013–2015 courses, and all the participants were students. It was considered a compulsory activity for all nursing students enrolled in the Nursing Degree that year and scored on the final score in the subject Special Situations, but students who do not wish to attend or participate are clearly within their rights not to participate, but are informed through the program of the subject, that they will not score it. In exceptional cases, and it has not given any cases, students who for personal issues cannot perform the simulation (for near deaths, or family situations) it must make known to the teacher responsible for the values.

Each group was formed by nineteen students, with subgroups of four or five students each. Every group attended two scenarios having each one a determined or established diagnosis or procedure. Each practice lasted 2 h, each case approximately 15 min, and the phase of reflection or debriefing was about 25 min long.

The development of each situation was recorded on video and audio to be discussed by the case instructor and students later and to verify possible doubts among observers. The instructor outside the simulation room was in constant communication via microphones and headphones, allowing him to inform the coach inside the room of the activity progress.